# Cortical Visual Impairment (CVI)

### Defined, Diagnosed, Assessment, Service Provision, and Questions from the Field

The Pennsylvania Advisory Committee on Education of Students Who Are Blind or Visually Impaired (PACES – BVI) responds to request for information relating to preferred practices and provision of services by appropriately credentialed professionals for students with a neurological-based vision impairment.

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## CVI – Is It Cortical Visual Impairment or Cerebral Visual Impairment? Just What Is CVI?

**Cortical or Cerebral Visual Impairment (CVI)** is a form of neurological visual impairment caused by dysfunction of the brain rather than a disorder of the ocular system. The terms **Cortical Visual Impairment** and **Cerebral Visual Impairment** have different etiologies, but they are often used interchangeably.

Neurologically based visual impairments, including CVI, may be temporary or permanent and can range from mild visual impairment to total blindness. CVI interferes with the brain's visual systems ability to consistently understand or interpret what the eyes see.

**Cortical Visual Impairment** refers to brain damage to the sites in the visual cortex or cortical regions. It is thought to affect the Dorsal Stream: The “Where and How pathway” and the Ventral Stream: “Conscious Vision” (Lueck & Dutton, 2015; Dutton 2003).

CVI is a “…brain-based visual problem to which specific criteria can be applied. These criteria include the following three elements:

- Eye exam that does not explain the individual’s functional use of vision
- History of a brain condition, trauma, or damage associated with CVI
- Presence of certain visual and behavioral characteristics” (Lueck & Dutton, 2015; Roman-Lantzy, 2018).

**Cerebral Visual Impairment** refers to brain damage beyond sites in the visual cortex or cortical regions. It is “vision impairment due to damage or disorder of the visual pathways and visual centers in the brain, including the pathways serving visual perception, cognition, and visual guidance of movement” (Lueck & Dutton, 2015).

## Is CVI a Visual Impairment?

The Individuals with Disabilities Education Act (IDEA) of 2004 defines **visual impairment** as, “an impairment in vision that, even with correction, adversely affects a child’s educational performance. The term includes both partial sight and blindness.” By this definition, a CVI diagnosis qualifies a child for special education and related services. It is known that CVI is the leading cause of visual impairment in developed countries (Solebo, Teoh, & Rahi, 2017).

## How is CVI Diagnosed?

CVI must be diagnosed by a medical practitioner. A diagnosis of CVI is made when a child is exhibiting signs of vision loss, but an ophthalmologist reports normal eye anatomy. However, CVI often coexists with ocular visual disorders, and many neurological disorders can cause CVI. If vision is a concern, then both a pediatric ophthalmologist and pediatric neurologist should be consulted.

## Diagnoses to Referral

Once a medical practitioner diagnoses CVI, the child is referred to a **certified teacher of students with visual impairments (TVI)**. The TVI will conduct additional assessments and

provide necessary educational interventions and specialized instruction. Assessments will include a **functional vision assessment (FVA)**, a **learning media assessment (LMA),** and other specialized assessments designed to identify appropriate educational strategies, necessary modifications or adaptations, and any technology or other tools that will ensure equal access to the curriculum. Evaluation and instruction by a **certified orientation and mobility specialist (COMS)** may also be recommended.

## Who is Qualified to Evaluate and Provide Services to Children with CVI?

According to IDEA, all children and youth with visual impairments, including those who may have additional disabilities, should be properly evaluated by a certified teacher of students with visual impairments who is equipped with and use multiple assessment tools to determine each student's individual sensory channels, functional vision, learning media and expanded core curriculum needs.

### Pennsylvania Certified Teachers of Students with Visual Impairments

Teachers of students with visual impairments (TVIs) are specialized teachers trained to address the diverse needs of the heterogeneous population of children with visual impairments. TVIs may work with a variety of age groups and also within a variety of instructional settings. Students' diverse needs may be addressed through individualized goals and instruction in expanded core curriculum areas.

#### To become a certified TVI

To become TVI certified in Pennsylvania you must:

- Complete a teacher of the visually impaired preparation program at an accredited university and show transcripts of completion. This can be done at a bachelor's or master's level.
- Complete a clinical practice.
- Take the ETS Teaching Students with Visual Impairments PRAXIS exam and earn a passing score.
- Obtain Pennsylvania Level I Certification in Blindness/Visual Impairment.

### Preparation Programs Standards and Guidelines for Teachers of Students with Visual impairments in Pennsylvania

There are three universities in Pennsylvania that prepare candidates to become teachers of students with visual impairments. These include Kutztown University, Salus University, and the University of Pittsburgh. All three universities use the Council for Exceptional Children (CEC) general teacher preparation standards and Visual Impairment Specialty set to guide their programs and ensure all teachers graduating from the program are well-rounded and prepared teachers of the visually impaired. These standards are national guidelines for preparing teachers of students with visual impairments to work with children and youth with ocular or neurology-based visual impairments with or without additional disabilities. Each program must demonstrate how the standards are met in order to receive national accreditation. The standards are embedded throughout courses within each university's programs. All programs require extensive field hours working under a Level II certified teacher of the visually impaired prior to completion of the program. Pennsylvania currently does not offer reciprocity from other states to be teacher of the blind certified. Candidates who are certified in other states will have to complete Pennsylvania testing and requirements to gain Pennsylvania certification.

### To maintain certification

TVIs and COMS need to have access to resources and participate in professional development opportunities to maintain certification through the certifying bodies. Multiple sources such as PaTTAN, universities, local education agencies, approved private schools and professional organizations provide continuing education activities.

## What Assessment Tools Are Used by a Program for Students with Visual Impairments to Address Referral and Service Provision?

### Functional Vision Assessment (FVA)

**Functional vision assessment** tools provide a comprehensive assessment of aspects of visual functioning including the physical condition of the eye/structure of the eye, reflexive responses, near vision, distance vision, eye movements, visual fields, color vision, lighting and contrast, perceptual variations, and other visual behaviors (D'Andrea & Farrenkopf, 2000). This assessment provides essential information for the educational team regarding lighting, access and accommodations to materials, optimal visual distances, and environmental and positional

considerations for the student. The purpose of an FVA is to ensure that information is presented to a student in the most useful and meaningful way.

When conducting an FVA on students diagnosed with CVI, teachers of students with visual impairments needs to gather data from a variety of perspectives. The functional vision assessment includes, but is not limited to, a review of the learner's medical and visual history, interviews, observations, and direct assessment. The impact of the environment on the student's visual performance is also considered.

The direct assessment can include visual attention, contrast, color preference, visual complexity, visual field preferences, depth perception, discrimination, sensory motor behaviors, visual recognition, and other areas that the TVI sees appropriate.

The FVA occurs when a student is first referred for services and continues as an ongoing monitoring process.

## Learning Media Assessment (LMA)

The **Learning Media Assessment (LMA)** is a systematic approach to collect and analyze data regarding a student's sensory preferences, learning environments, and interventions and methods to read, write, and compute. It is used in conjunction with the functional vision evaluation to describe the sensory abilities of a student with VI. The LMA occurs when a student is first referred for services and continues as an ongoing monitoring process.

Determining whether the student will be a tactual (braille) or visual (print) access learner is guided by the Learning Media Assessment (LMA) process. LMA results and informed discussions provide the needed platform to determine access decision(s).

## Other Specialized Assessments - Expanded Core Curriculum (ECC) Needs Assessment

In addition to receiving instruction in general education curriculum, students with visual impairments need specific instruction and training in the ECC in order to gain skills and knowledge that typically developing learners gather incidentally through vision.

The ECC needs assessment is a screening tool that collects strength-based information on the student's compensatory access skills, social interaction skills, orientation and mobility skills,

independent living skills, recreation and leisure skills, career education, assistive technology and other technology skills, self- determination, and sensory efficiency skills.

The ECC needs assessment tool collects information from teachers, families, students, and other service providers. This tool and process begin the conversation about the student's instruction in the ECC and facilitate common terminology and understanding. This tool and procedure do not replace an age-level or grade-level assessment, but rather they supplement them. The ECC tool and process is designed to identify appropriate educational strategies, necessary modifications or adaptations, and any technology or other tools that will ensure equal access to the curriculum. ECC Needs Assessment occurs when a student is first referred for services and continues as an ongoing monitoring process.

### Are There CVI-Specific Assessment Tools?

Yes, however, it is important to remember that IDEA mandates the use of multiple assessment tools, and a multidisciplinary assessment is recommended for students with CVI due to the complex nature of the disorder and the possible presence of ocular and additional cognitive or physical disabilities that must be concurrently assessed. The CVI Range was developed by Dr. Christine Roman-Lantzy and is a functional vision assessment tool designed specifically for use with individuals with CVI. Additional CVI assessment tools are provided in Assessments of Children with CVI by Lueck and Dutton.

## Service Provision for Students with Visual Impairments Who Have CVI – What Does It Look Like?

With the medical diagnosis of CVI, the parent should provide a copy of the medical report to the Local Education Agency (LEA) for review and to include as part of the Evaluation Report. The LEA will issue a Prior Written Notice (PWN) for Initial Evaluation and Request for Consent Form or a Prior Written Notice for Re-evaluation and Request for Consent Form to the parent/guardian as appropriate, which would include a list of assessments that should be conducted to determine eligibility or the need for additional supports and services.

CVI often coexists with ocular visual disorders, and many neurological disorders can cause CVI. Therefore, in addition to a Functional Vision Assessment, which includes, but is not limited to, a review of the learner's medical and visual history, interviews, observations, and direct assessment as conducted by a certified TVI. The Evaluation should include

psychological and achievement assessments, parent/teacher input, speech/language, motorical, and/or behavioral assessments as deemed appropriate. Upon receipt of the signed PWN, the LEA must conduct the Evaluation Report within 60 calendar days per IDEA and Pa Chapter 14, not including summer, and provide a written report to the parent/guardian indicating whether or not the student meets the eligibility criteria. Does the student have a disability and is he/she in need of specially designed instruction? If the criteria are met, an Individualized Education Plan would need to be developed within 30 calendar days of the Evaluation Report and a Notice of Recommended Educational Placement issued to the parent/guardian indicating the type/s and level/s of support/s that the student requires in order to be academically successful as determined by the IEP Team. An IEP for a student with CVI should include direct instruction by a Certified TVI, Orientation and Mobility as appropriate, modifications and adaptations specific to the impact of CVI on the student's ability to access the general curriculum, and the use of technology vital to the student's educational programming. These supports would co-exist with any others determined necessary by the IEP Team.

## Addressing Questions from the Field about CVI

This section provides needed details regarding the CVI Range and the now discontinued Perkins-Roman CVI Range Endorsement to address questions that have been received from the field.

### What is CVI Endorsement?

The Perkins-Roman CVI Endorsement was a micro-credential offered by the Perkins School for the Blind. Perkins is a private organization that offers various types of continuing education courses and credits. However, Perkins is not a recognized, independent accreditation body. It discontinued the Perkins-Roman CVI Range Endorsement in 2021 because assessor competency in administering the CVI Range could not be ensured. For more information about this change go to the Statement from Ed Bosso, President of Educational Programs and Superintendent at Perkin School for the Blind.

### Did the Perkins-Roman CVI Endorsement Extend to Intervention and Educational Strategies?

The premise of the Perkins-Roman CVI Range Endorsement was that it reflected an ability to administer the CVI Range. The endorsement did not extend to implementing CVI interventions and educational strategies.

## Was Perkins-Roman CVI Endorsement a Recognized Related Service in IDEA and Chapter 14?

The Perkins-Roman CVI Range Endorsement was not a related service nor was it a requirement under IDEA or Chapter 14 to provide a related service. With its discontinuation, students who have a CVI diagnosis will continue to be provided services by certified Teachers of Students with Visual Impairments.

Section 300.34(a) of IDEA includes the following:

“Related services means transportation and such developmental, corrective, and other supportive services as are required to assist a child with a disability to benefit from special education, and includes speech-language pathology and audiology services, interpreting services, psychological services, physical and occupational therapy, recreation, including therapeutic recreation, early identification and assessment of disabilities in children, counseling services, including rehabilitation counseling, orientation and mobility services, and medical services for diagnostic or evaluation purposes. Related services also include school health services and school nurse services, social work services in schools, and parent counseling and training.”

## What is the CVI Range?

The CVI Range is one tool used to assess the functional vision of students with CVI. It helps “to determine the degree of impact, or extent of the effect, of CVI” (Roman-Lantzy, 2018).

### How was the CVI Range developed?

Dr. Roman-Lantzy created the CVI Range based on the work of Dr. James Jan and colleagues based in British Columbia, Canada. Dr. Jan was one of the first professionals to suggest that individuals with cortical visual impairment (CVI) behaved in unique ways that are

distinguishable from individuals who have ocular impairments without cortical involvement. The other significant influence for the CVI Range was Dr. Roman-Lantzy's experiences with parents and children including her dissertation research.

### Is the CVI Range research based?

The CVI Range is based on research, but it does not meet the definition of evidence-based. Evidence-based strategies and tools have been found effective when subjected to highly credible research practices (Cook et al., 2014). Little formal research exists on the CVI Range. This is common among low-incidence disabilities with an underdeveloped research base.

### Is the CVI Range a reliable and valid tool?

Reliability is the likelihood of different individuals with sufficient training, such as teachers of students with visual impairments, to administer a protocol such as the CVI Range, to obtain scores that are highly correlated. Reliability also refers to the likelihood of obtaining a highly correlated score when a protocol is administered at different points in time by the same person (Ary, Cheser Jacobs, Sorensen Irvine, & Walker, 2018). The reliability of this tool has been assessed by Dr. Sandra Newcomb as part of her dissertation research. The tool was found to be reliable. (Newcomb, 2010).

There are typically two types of **validity** that are of primary importance for assessment protocols of this nature: **content validity** and **construct validity**.

**Content validity** is a non-statistical measure that involves the systematic examination, typically by expert review, to ensure a tool encompasses a representative sample of all the agreed-upon domains in the research literature (Ary et al., 2018). Content validity has not been assessed for the CVI Range.

**Construct validity** is a statistical measure that is assessed by comparing how an instrument evaluates content or behavior compared to other instruments that evaluate the same content or behavior. Dr. Roman-Lantzy has studied the construct validity of a parent survey she developed to be used in place of a functional vision assessment to determine if an individual had a cortical visual impairment or an ocular visual impairment (Roman, 1996). The construct validity of the CVI Range in its current form has not been assessed.

## References

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## Resources

**American Foundation for the Blind:** Cortical/Cerebral Visual Impairment, Traumatic Brain Injury, and Neurological Vision Loss

**American Printing House for the Blind:** CVI

**CViCONNECT:** CViCONNECT

**CVI Scotland**: CVI Scotland Sharing and Developing our Understanding of CVI

**Paths to Literacy:** CVI Resources

**Pennsylvania Training and Technical Assistance:**

- CVI Spring Training Past the Basics, 2016
- CVI Spring Training Session II, 2016
- YouTube CVI Series - CVI: Identification, Assessment and Intervention, 2020

**Perkins School for the Blind e-Learning:** CVI Resources

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